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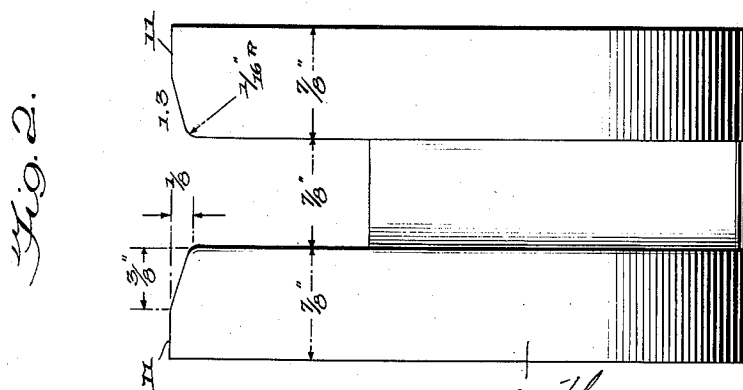
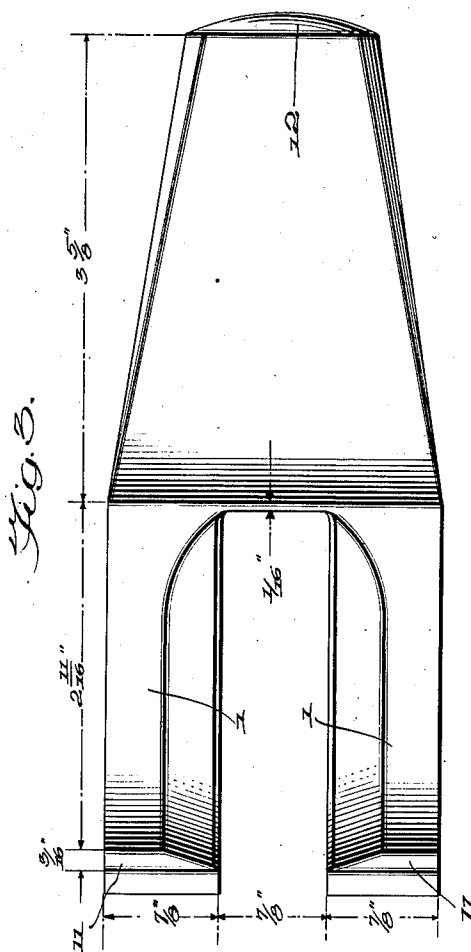
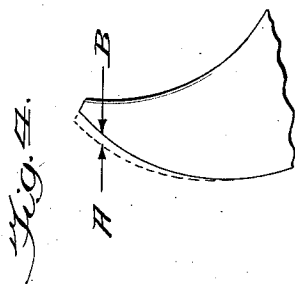
T. MANEY

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MEANS FOR DRAWING RAILWAY SPIKES

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Inventor

By

Thomas Maney
Vernon E. Keady
Attorneys

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MEANS FOR DRAWING RAILWAY SPIKES

Thomas Maney, Louisville, Ky.

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5 Claims. (Cl. 254—25)

My invention relates to an improvement in means for drawing railway spikes.

The method of drawing spikes has undergone little or no change during my recollection, and possibly not since the beginning of the art.

The ordinary process is to employ a bar approximately sixty inches long and weighing from thirty to thirty-five pounds with a claw-shaped bottom terminating in a heel somewhat resembling the human foot. This pulls the spike-head through an arc varying from one to five inches in radius, consequently bending the spike, injuring the wood fibre of the tie and creating a great amount of unnecessary resistance in the withdrawal of the spike. To attain the maximum leverage, the operator pulls the bar from the extreme end. The bar often slips, with the result that the operator is sometimes thrown upon the track with the bar on top in many instances; and the only reason that operators while doing this do not more frequently fall from high structures, trestles and the like is, that natural caution coupled with a knowledge of what to expect, discourages applying full force and strenuous effort.

The blows from an eight-pound spike maul with a three-foot handle are sufficient to drive spikes into a hard oak tie, but to press this spike in without the sledge-hammer blow impact would probably require in the neighborhood of forty thousand pounds pressure.

To withdraw the same spike under pressure without impact, as with the bar, requires approximately a seven thousand pound pull, so it appears that the spike is about six times as hard to drive as to remove; but if we can change the method of withdrawal from what might be called static pressure, as with the bar, to a system of impact, the spike could be withdrawn with the same relative ease as it is driven.

That brings us to the device shown in the accompanying drawings.

Fig. 1 is an end elevation of a rail and tie plate and showing my improvement in full lines in elevation, and in dotted lines in the position at the start;

Fig. 2 is an end elevation of my spike puller; Fig. 3 is a plan view thereof; and

Fig. 4 shows an elevation of a slightly modified form of the points.

A, in Fig. 4, represents the tool in its preferred form; and B, illustrates it with the end modified by coming to a slightly sharper point.

The upper and lower curves marked 1 and 2, respectively, are not simple curves but parabolas,

and are preferably so formed and related to each other as to keep the head 3 of the spike always practically tangential to the upper arc 1 and to cause the lower arc 2 guided by the two points of contact 4 and 5 of the tie-plate 6 to traverse the greatest diagonal which the rail section permits, namely the area 7 between the tread 8, web 9 and base 10 of the rail, thereby obtaining the maximum lift of the spike as indicated by the dotted lines in Fig. 1.

The tool may be made of forged steel weighing perhaps six pounds and might be called a curved split wedge. The method of applying and using the tool is illustrated in Fig. 1. The sides of the tool or wedge are preferably identical. The tips 11 are inserted under the spikehead 3, as shown in dotted lines at the right in Fig. 1, astride the stem of the spike claw-like, and resting upon the shoulder 4 of the tie-plate as well as fulcruming on the base at the point 5 of the tie-plate.

The tool is then struck sharply and repeatedly on the driving end 12 with a maul or sledge-hammer used for the purpose, and with these repeated blows the tool or wedge turns by gradual pressure from the position indicated in dotted lines to the full-line position shown in Fig. 1, and by the time the driving end assumes the horizontal, the spike has been lifted vertically to the upper position and is to all intents and purposes loosened and drawn, and may then be removed entirely with the fingers or by a sharp up-stroke with the tool or wedge.

In this way we get the loosening effect of sharp impact coupled with the lifting effect of the wedge, which is the most intense form of leverage.

The tie-plates heretofore used are provided with shoulders on the outer edge only, although this is undergoing change and shoulders are now commonly provided at both ends; but this makes no difference in the application of the tool, and in the absence of a shoulder such as indicated by the numeral 4, the actuating points would be the top of the plate as at 5 and the edge of the rail base in lieu of the shoulder 4.

Contact with the spike-head is always within the confines of the spike stem or shank and always between the points 4 and 5, so that the spike lifts vertically without any disturbing lateral pressure or tendency to bend.

After the spike has been raised, say half-way, it might be considered that there would be a tendency for the spike-head to follow the movement of the arc; but this is not so for by keeping the spike-head tangential to the arc, angles are eliminated and the vibration from the blow

releases the frictional hold so that the tendency to lateral drag is not cumulative.

In practice, it would be desirable to keep the sliding contacting surfaces lubricated.

- 5 Occasion might require some modification in the shape and dimension of the tool, as for instance, the points of the claw might be a little thinner to facilitate free entrance under the spike-head as illustrated in Fig. 4, but in thus
10 thinning the ends, due regard must be had for requisite strength. In any event, it is obvious that minor changes might be made, and I do not care to be limited too closely to the exact dimensions of the structure illustrated and described.
15 The fundamental idea in view is to change the present method of withdrawal from static pull to impact, and to increase the power and acquire the desired lift by the use of the peculiar cam-like wedge operating within prescribed limits fixed
20 and determined by the rail.

With these ideas in view, the desideratum is to raise the spike vertically without undue lateral pressure at any time and to such an extent that it may be readily extracted by even the fingers
25 or up-stroke with tool used.

In the form illustrated, I had in view certain requisites:

- (1) To get under the head of the spike at the start with the minimum angle. For this reason,
30 the parabolic shape of the curve was adopted with the sharpest part of the curve at the point of the claw. Another reason for the parabola was to prevent contact with the stem or web 9 of the rail before reaching the maximum lift as is clearly
35 viewed in Fig. 1 of the drawings.

- (2) To so relate the curves that while the lower arc 2 is more or less fixed in its path by its bearing on the tie-plate 6, the upper curve 1 may remain at all points practically parallel or tangential to
40 the head of the spike. Also that the spike may have the maximum lift, the curves adopted and as marked on Fig. 1 are not true conic parabolas, but what is technically known as a spiral, which is the working substitute for the parabola. It
45 begins at the point of the claw, lower arc 2, preferably with a chord of three inches radius followed by chords of equal length, each consecutive chord having a fixed increase in length of radius so gradually diminishing the degree of curvature
50 as with the parabola.

I have found the best way to locate the curvature is by ordinates from a chord connecting the extremes of the curve. As shown, the ordinates are expressed in decimals of one inch. Extreme
55 points are located from the straight side of the tool parallel with the base of the rail and from a line vertical to this side.

I claim:

1. A tool of the character described in the nature of a claw, and in the general form of a wedge having non-parallel curvatures on opposite edges, the lower of which guides and determines the path of movement, and the upper forms
5 a spike engaging portion and is in position to slide beneath the spike-head while the latter is maintained tangentially with respect thereto.

2. A tool of the character described in the nature of a claw and in the general form of a
10 wedge having non-parallel curvatures on opposite edges in the form of parabolas, the lower of which guides and determines the path of movement, and the upper of which slides beneath the spike-head while the latter is maintained tan-
15 gentially with respect thereto.

3. A tool of the character described having a driving end at one extreme end thereof against which blows may be applied longitudinally of the tool, and said tool having a wedge-like claw at the
20 opposite end thereof, said claw having a notch therein to embrace a spike under the head thereof and having curved upper and lower edges, said curved edges being approximately parabolic longitudinally of the tool with the greater curvatures
25 adjacent the forward end of the claw.

4. A tool of the character described having a driving end at one extreme end thereof against which blows may be applied longitudinally of the tool, and said tool having a wedge-like claw at the
30 opposite end thereof, said claw having a notch therein to embrace a spike under the head thereof and having curved upper and lower edges, said curved edges being approximately parabolic longitudinally of the tool with the greater curvatures
35 adjacent the forward end of the claw, the upper curved edge being so arranged as to lie approximately tangentially of the spike head in different positions of the tool and the lower curved edge being arranged to form a fulcrum for the tool to
40 cause gradual turning thereof during application of a series of blows to the driving end in a direction longitudinally of the tool.

5. A tool of the character described having a driving end at one end of the tool and having a
45 wedge-like claw at the opposite end thereof, said claw having a notch therein to embrace a spike under the head thereof, the upper sides of said notch being longitudinally curved and so arranged as to lie approximately tangentially of the
50 spike head in different positions of the tool, and the claw having a longitudinally curved lower edge arranged to form a fulcrum for the tool to cause gradual turning thereof in withdrawing a spike.

THOMAS MANEY.